

CLAIMS

1. An apparatus for preparing a wafer, comprising:
a wafer backside plate having a top surface configured to include a cylindrical
5 edge lip that defines a central aperture;
a central shaft configured to fit within the central aperture, the wafer backside
plate being configured to automatically slide between an up position during rotational
wafer processing and a down position when not in rotational wafer processing, wherein a
gap defined between the top surface of the wafer backside plate and the wafer is less
10 when in the up position than when in the down position.
2. An apparatus of claim 1, wherein the central shaft includes a height
adjustment slot that is configured to engage the wafer backside plate.
- 15 3. An apparatus of claim 2, wherein the cylindrical edge lip of the wafer
backside plate includes a pin that is designed to slide within the height adjustment slot.
4. An apparatus of claim 3, wherein the pin slides from a lower position in
the height adjustment slot to an upper position in the height adjustment slot during
20 rotational wafer processing.
5. An apparatus of claim 3, wherein the pin slides from an upper position in
the height adjustment slot to a lower position in the height adjustment slot when
completing rotational wafer processing.

6. An apparatus of claim 4, wherein rotational wafer processing includes spinning each of the wafer backside plate and the shaft to rinse and dry the wafer.

5 7. An apparatus of claim 5, wherein rotational wafer processing includes spinning each of the wafer backside plate and the shaft to rinse and dry the wafer.

8. An apparatus for preparing a wafer, comprising:
a chuck having a plurality of grippers for holding the wafer;
10 a wafer backside plate having a top surface, the wafer backside plate including a cylindrical edge lip that defines a central aperture;

a shaft connected to a central portion of the chuck and configured to receive and engage the central aperture of the backside plate, the wafer backside plate being configured to automatically slide between an up position during rotational wafer
15 processing and a down position when completing rotational wafer processing, wherein a gap defined between the top surface of the wafer backside plate and the wafer is less when in the up position than when in the down position.

9. An apparatus of claim 8, wherein the shaft includes a height adjustment
20 slot that is configured to engage the wafer backside plate.

10. An apparatus of claim 9, wherein the cylindrical edge lip of the wafer backside plate includes a pin that is designed to slide within the height adjustment slot.

11. An apparatus of claim 10, wherein the pin slides from a lower position in the height adjustment slot to an upper position in the height adjustment slot during rotational wafer processing.

12. An apparatus of claim 10, wherein the pin slides from an upper position in the height adjustment slot to a lower position in the height adjustment slot when completing rotational wafer processing.

13. An apparatus of claim 11, wherein rotational wafer processing includes spinning each of the wafer backside plate and the shaft to rinse and dry the wafer.

14. An apparatus of claim 12, wherein rotational wafer processing includes spinning each of the wafer backside plate and the shaft to rinse and dry the wafer.

15. An apparatus for spinning, rinsing and drying a wafer, comprising:
a chuck having a plurality of wafer holders for holding the wafer during the spinning, rinsing and drying;

a wafer backside plate having a disk-like top surface that mirrors the wafer being held by the holders above the wafer backside plate, the wafer backside plate including a cylindrical edge lip at a center, the edge lip having an inner surface that defines a central aperture;

a shaft connected to a central portion of the chuck and configured to receive and engage the central aperture of the backside plate, the wafer backside plate being configured to automatically slide between an up position during rotational wafer

processing and a down position when completing rotational wafer processing, wherein a gap defined between the top surface of the wafer backside plate and the wafer is less when in the up position than when in the down position.

5 16. An apparatus for spinning, rinsing and drying a wafer as recited in claim 15, wherein the shaft includes a height adjustment slot that is configured to engage the wafer backside plate.

10 17. An apparatus for spinning, rinsing and drying a wafer as recited in claim 15, wherein the cylindrical edge lip of the wafer backside plate includes a pin that is designed to slide within the height adjustment slot.

15 18. An apparatus for spinning, rinsing and drying a wafer as recited in claim 15, wherein the pin slides from a lower position in the height adjustment slot to an upper position in the height adjustment slot during rotational wafer processing.

20 19. An apparatus for spinning, rinsing and drying a wafer as recited in claim 15, wherein the pin slides from an upper position in the height adjustment slot to a lower position in the height adjustment slot when completing rotational wafer processing.

20 20. A method for spinning a wafer to enable rinsing and drying, the method comprising:

engaging the wafer at a wafer processing plane;

spinning the wafer;

raising a wafer backside plate from a lower position to an upper position as the spinning of the wafer proceeds to an optimum spinning speed, the upper position defining a reduced gap between an under surface of the wafer and a top surface of the wafer backside plate; and

5 lowering the wafer backside plate from the upper position to the lower position as the spinning reduces in speed, the lower position defining an enlarged gap to enable loading and unloading of the wafer from the engaged position.

21. The method of claim 20, wherein the operation of engaging the wafer at a
10 wafer processing plane is performed by holders.

22. The method of claim 20, wherein the backside plate includes a central cylindrical edge lip having an inner surface that defines a central aperture.

15 23. The method of claim 22, further comprising:

 providing a pin on the inner surface of the cylindrical edge lip;

 providing a height adjustment slot on a shaft configured to fit within the central aperture;

 inserting the pin inside the height adjustment slot such that the pin slides from a
20 lower position in the height adjustment slot to an upper position in the height adjustment slot during rotational wafer processing.

24. The method of claim 22, further comprising:

 providing a pin on a shaft configured to fit within the central aperture;

providing a height adjustment slot on the inner surface of the cylindrical edge lip
inserting the pin inside the height adjustment slot such that the pin slides from a
lower position in the height adjustment slot to an upper position in the height adjustment
slot during rotational wafer processing.

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25. A method for spinning a wafer to enable rinsing and drying, the method
comprising:

engaging the wafer at a wafer processing plane;

10 spinning the wafer and a backside plate, the backside plate being defined below
the wafer processing plane;

raising the wafer backside plate from a lower position to an upper position as the
spinning of the wafer proceeds to an optimum spinning speed, the upper position
defining a reduced gap between an under surface of the wafer and a top surface of the
wafer backside plate; and

15 lowering the wafer backside plate from the upper position to the lower position
as the spinning reduces in speed, the lower position defining an enlarged gap to enable
loading and unloading of the wafer from the engaged position.

26. The method of claim 25, wherein the backside plate is configured to
20 include a cylindrical edge lip having an inner surface that defines a central aperture.

27. The method of claim 26, further comprising:

providing a pin on the inner surface of the cylindrical edge lip;

providing a height adjustment slot on a shaft configured to fit within the central aperture;

inserting the pin inside the height adjustment slot such that the pin slides from a lower position in the height adjustment slot to an upper position in the height adjustment slot during rotational wafer processing.

28. A method for spinning a wafer to enable rinsing and drying, the method comprising:

providing a wafer over a process bowl;

engaging the wafer at a wafer processing plane;

spinning the wafer and a backside plate, the backside plate being defined below the wafer processing plane;

raising the wafer backside plate from a lower position to an upper position as the spinning of the wafer proceeds to a process spinning speed, the upper position defining a reduced gap between an under surface of the wafer and a top surface of the wafer backside plate; and

lowering the wafer backside plate from the upper position to the lower position as the spinning reduces in speed, the lower position defining an enlarged gap to enable loading and unloading of the wafer from the engaged position.

29. A method for spinning a wafer to enable rinsing and drying, the method comprising:

(a) providing a wafer over a process bowl;

(b) engaging the wafer at a wafer processing plane;

(c) spinning the wafer and a backside plate, the backside plate being defined below the wafer processing plane;

(d) raising the wafer backside plate from a lower position to an upper position as the spinning of the wafer proceeds to a process spinning speed, the upper position
5 defining a reduced gap between an under surface of the wafer and a top surface of the wafer backside plate, the reduced gap configured to reduce turbulent airflow under the wafer;

(e) lowering the wafer backside plate from the upper position to the lower position as the spinning reduces in speed, the lower position defining an enlarged gap to
10 enable loading and unloading of the wafer from the engaged position;

(f) disengaging the wafer;

(g) removing the wafer from over the process bowl; and

(h) repeating (a)-(g) for additional wafers.

15 30. The method of claim 29, wherein the operation of providing a wafer over a process bowl is performed by an end effector.